EXHIBIT 2
(REDACTED)

REDACTED VERSION OF DOCUMENT FILED UNDER SEAL

In The Matter Of:

Illumina Inc v.

BGI Genomics

David Smith, Ph.D.

April 20, 2020

HIGHLY CONFIDENTIAL - ATTORNEYS EYES ONLY

Min-U-Script® with Word Index

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

HIGHLY CONFIDENTIAL - ATTORNEYS EYES ONLY

ILLUMINA, INC., ILLUMINA CAMBRIDGE LTD., Plaintiffs, vs. BGI GENOMICS CO., LTD., BGI AMERICAS CORP., MGI TECH CO., LTD., MGI AMERICAS, INC. and COMPLETE GENOMICS, INC., Defendants.	Case No.: 3:20-cv-01465-WHO

* *

ORAL AND VIDEOTAPED DEPOSITION

DAVID I. SMITH, Ph.D.,

APRIL 20, 2020

* *

ORAL and VIDEOTAPED DEPOSITION, conducted virtually, OF DAVID I. SMITH, Ph.D., produced as a witness at the instance of the Plaintiffs, and duly sworn, was taken in the above-styled and numbered cause on April 20, 2020, from 10:30 a.m. to 5:04 p.m., Eastern Standard time, before LISA A. BLANKS, CSR, RPR, CRR, reported by machine shorthand.

States having to send a sample out and then everything is dependent on BGI.

Q. BY MR. REINES: No, I was talking about intends. You understand that BGI is proposing to sell sequencers in the United States, correct?

A. Yes, I am.

Q. And in terms of the -- and you believe that they're -- that the introduction by BGI of sequencers in the United States would substantially reduce the pricing for sequencers and sequencing reagents going forward, correct?

A. Would reduce the price of sequencers for the purchase of BGI machines or in general?

Q. You believe that in general if BGI were permitted to sell sequencing systems in the United States, that that would substantially drive down the price of said systems, correct?

MS. SCOTT: Objection.

THE WITNESS: I believe -- I'm sorry, Katie.

If there was competition in the sequencing space and it actually cost less to do sequencing, there would be much more sequencing done.

Q. BY MR. REINES: Okay. That's not -- that's dancing around my question. Try to answer my question specifically.

If BGI introduces sequencers in the United States, one of the beneficial effects, from your perspective of that, would be to drive down the cost of buying sequencers and sequencing reagents, correct?

MS. SCOTT: Objection, vague.

THE WITNESS: I believe the competition in the sequencing space benefits the consumer.

Q. BY MR. REINES: I understand that.

I'm asking you to sort of join -- meet my question. You believe that the cost for sequencing -- I think this is in your declaration and maybe I'll find the quote of it -- you believe that if BGI were to compete with Illumina in the United States for sequencer sales, that the cost of sequencing would go down, right, that's the thesis of your opinion?

MS. SCOTT: Objection, vague.

THE WITNESS: I do not believe it would immediately decrease the cost of sequencing, but I believe in a multi-year time frame, it indeed would.

Q. BY MR. REINES: Okay, so let me ask the question again.

In terms of the cost of sequencers and sequencing reagents in the United States, you believe that that would go substantially down if you -- if over a multi-year time period if BGI is permitted to sell

sequencers in the United States, right?

MS. SCOTT: Objection, vague.

THE WITNESS: The word -- where I would emphasize is that in a multi-year time frame, I believe the net effect would be to drive down the cost for doing certain things on the sequencers. For example, 30X whole-genome sequence.

Q. BY MR. REINES: And given that's your opinion, to what extent do you believe the introduction of the BGI sequencers in the United States would drive down the price for sequencers and sequencing?

MS. SCOTT: Objection, vague, and outside the scope.

THE WITNESS: Again, in a multi-year time frame, to go from a market where there is absolutely no competition, which is the current market, to one where there is any competition, should have that net effect in a multi-year time frame.

Q. BY MR. REINES: I'm saying, to what -- can you quantity or describe qualitatively what the reduction in the price for sequencers and sequencing reagents would be if BGI systems were to --

(Clarification requested by court reporter.)

MS. SCOTT: Objection, vague, outside the scope.

samples, right?

A. No, I did not. But in answer to your question, if I wanted to do additional sequencing, I certainly would have to pay for it.

Q. And was 34 samples of information a sufficient amount of information for you to make a judgment as to the sequencing quality on the BGI system?

A. Absolutely.

Q. Now, at the bottom of the page, you include a diagram of the CoolMPS.

Do you see that?

A. Yes, I do.

Q. And you don't state anything about benefits or the quality of the sequencing relating to the Cool technology, right?

A. This was written -- it was published in late fall, but it was written by me in the summer of 2019; so no.

Q. In the summer of '19, were you aware of any of the advantages of the Cool technology?

A. No, I was not.

Q. And did you gain whatever understanding you have of what you're saying were advantages of the Cool technology based on the work that you've done in this case?

A. As a result of the work that I've done on this case and as a result of a non-peer-reviewed publication that was written by people at Complete Genomics where I could look in more detail, that's where I began to see some of the real advantages of this new sequencing modality.

Q. If you could see from the CGI article the advantages, then why would you need KOLs to validate a system before you would be willing to purchase it?

A. Again, this is a multi-step process. The first thing is to, you know, either hear it from somebody presenting at a scientific meeting, somebody outside of the company.

Secondly, you know -- and, again, it's the -- you don't need a KOL to be in this process. They can certainly contribute towards the process; but even if they -- I saw this and then I saw a peer-reviewed publication, that still would not be sufficient.

Then there would be -- the next step would be to actually be able to do some of the sequencing on that machine, not just sending it to somebody else, and then to see the quality of data that I could generate or on -- my place on that purchase. And then a really important question, and we talked about this earlier, how robust is this machine in its usage? And that

different criteria. And one is -- two, actually, irreparable harm and the public interest.

And I believe the public interest is broader than just protecting patents, and there may be other considerations that need to be considered. And, indeed, this was the basis of my argument in my declaration.

Q. BY MR. REINES: So your argument is based on the public interest, is that correct, in your report?

A. My argument is based upon two important criteria. I would say the first is public interest, but the second is your -- the Illumina claim of irreparable harm.

Q. And you'll agree that if BGI is permitted to sell competitively with Illumina, that it will take market share from Illumina, correct?

MS. SCOTT: Objection, vague, outside the scope of the report.

THE WITNESS: I believe that it will take a considerable amount of time for BGI to take even a small proportion of the market share from the mature Illumina platform.

Q. BY MR. REINES: Okay. And how long do you think it will take BGI to obtain considerable market share from Illumina?

MS. SCOTT: Objection, outside the scope.

size of the market. So my contention -- and this is what I wrote in my declaration -- is that competition, decreased costs will -- even if Illumina loses any portion, is more than compensated by increased sequencing that is done in general.

And my contention is that Illumina profits increase, not quantified, not decreased.

Q. BY MR. REINES: And in terms of your belief that Illumina would do better with a competitor because prices would come down and the pie would get bigger, will you agree that that's speculative, given, you know, the nature of the question and the limits of your expertise?

A. I would --

MS. SCOTT: Objection.

THE WITNESS: Sorry.

MS. SCOTT: Vague. Objection, vague.

THE WITNESS: I would contend that it's more than speculative based on my history and watching the microwave market and watching what's been happening for the past 13 years in the massively parallel sequencing market where it is always borne out that when these prices get less, volumes increase geometrically.

Q. BY MR. REINES: Okay. In terms of the benefit of the decreased cost from competition that you're --

that you're saying should go into the injunction decision here, how long do you think it would take for prices to decrease for sequencing if BGI was permitted to --

(Clarification requested by court reporter.)

Q. Introduce its products now.

A. Again, the adoption of a competing platform -- for example, the BGI platform is still a multiyear process. And as a result, more than likely this is -- this would take, again, I'd say as a bare minimum, maybe three years before enough people were able to use the BGI -- purchase, use the BGI machines, find them to be robust enough. And, again, we're describing phases. That's just Phase 2. Phase 3 is to purchase multiple machines and to start to use that in production.

Everything in Phase 1 and Phase 2 is purely experimental and has nothing to do with production, and production is where the volume and the profit is.

Q. And do you believe that customers -- based on your experience, do you believe customers would use the presence of the BGI alternative in purchase -- in price negotiations with Illumina?

MS. SCOTT: Objection, vague.

THE WITNESS: When I have compared other types of things where there is competition and there are

multiple choices, that really helps the consumer to get the best possible prices; so yes.

Q. BY MR. REINES: Okay. And you're saying that if BGI sequencers -- you know, they made a big announcement and have, you know, big ambitions to sell this year; you're saying that if that happened, do you -- will you agree that customers would be using that fact in their negotiations with Illumina right away?

MS. SCOTT: Objection, vague, and outside the scope.

THE WITNESS: I still contend that it's not an immediate effect because customers will not have a viable alternative until they know that the machines in their hands are robust, and that's a multiyear process.

So in answer to your question, no.

Q. BY MR. REINES: Okay. So -- and what you're proposing is B -- so your opinion is if BGI sequencers started being sold today, as the big announcement said at HEBT, that the price decreases that you're saying are favorable wouldn't happen for three years?

MS. SCOTT: Objection, vague.

THE WITNESS: Yes, that is my conjecture.

Q. BY MR. REINES: So you think it would take three years before customers of Illumina would use the fact of a BGI alternative to try to reduce Illumina's

known Illumina users to try to persuade them to use BGI's sequencers?

MS. SCOTT: Objection, vague, and outside the scope.

THE WITNESS: I -- if I were BGI, I certainly would. And the answer would be, yes, those are the people that you'd want to approach to see about, you know, utilizing a competitive platform.

Q. BY MR. REINES: And turning to the next slide -- I don't know if we have a better version of this. But in terms of what's written there, it says, "T7 priced aggressively against NovaSeq and G-400RS against NextSeq and HiSeq."

Do you see that?

A. Yes, I do.

Q. Are you surprised to see that BGI, when it introduces its T7 to the United States, if it's permitted to, would aggressively price against the NovaSeq and the G-400RS against the NextSeq?

A. I -- yes, I do. I understand that completely.

Q. And you're saying that if BGI follows through and there's no injunction and is able to aggressively price systems against Illumina systems, you don't think there would be any price erosion for Illumina? Is that what you're saying?

A. I think it would take considerably longer than Illumina is claiming as part of their preliminary injunction for there to be any significant erosion.

Q. And do you consider yourself an expert in that -- in that kind of market dynamic?

A. I do not.

Q. And you see in here it says, "Position the DNBSEQ-G50RS from HiSeq upgrade and offer G400RS at a special intro price."

Do you see that?

A. I see that.

Q. And based on what you know of BGI, would you expect them to be very aggressive in their introductory pricing?

MS. SCOTT: Objection, vague, and outside the scope.

THE WITNESS: I would expect them to try to be, yes.

Q. BY MR. REINES: Okay. And in terms of their special introductory pricing, would you expect that to be below cost?

MS. SCOTT: Objection, calls for speculation and outside the scope.

THE WITNESS: And also outside my area of expertise. I don't know the answer to any of these

THE WITNESS: I see that that is their estimation, yes.

Q. BY MR. REINES: Okay. Now, turning over to -- below here, it states, "Placement and reagent" -- number 1 there. It says, [redacted]

Do you see that?

A. Yes, I do.

Q. And do you understand one of the business models for the sequencers is [redacted]

A. I believe this is the exact same strategy that Illumina employed some 10 to 12 years ago to try to get sequencers into the market, yes.

Q. Okay. And the second -- you alluded to it earlier. This is what someone might call like the razor and razor blade model where the -- the consumables are often an important source of income?

MS. SCOTT: Objection, vague, calls for speculation.

THE WITNESS: Yes. This is something I stated earlier.

Q. BY MR. REINES: Right. And then -- so it says here, [redacted]

Do you expect that MGI would attempt to

aggressively drive reagent revenue if it were permitted to sell sequencers in the United States?

(Clarification requested by court reporter.)

Q. Sell its sequencers in the United States.

MS. SCOTT: Objection, vague.

THE WITNESS: I believe that would be a strategy that they would attempt to employ, but I still believe that the portion of the market that they could potentially get would be quite small and the ramp-up would be very slow.

Q. BY MR. REINES: And do you see in item number 2, it says, "Use all tactic to drive adaption"?

A. Yes, and I would expect any company to do that.

Q. Let's go back to -- let's go back to your -- your book.

MR. REINES: Andrew, do you know what the exhibit number is for that so we have that for the record?

MR. GESIOR: Exhibit 54, the Sequencing Buyer's Guide.

THE WITNESS: It's on screen.

MR. REINES: Okay. Hang on one second.

MS. SCOTT: Would you like to go off the record?

of potential advantages of the BGI system that I was not aware of when I wrote this buyer's guide.

Q. Okay. In terms of the potential technical advantages of the BGI system relative to Illumina, you'll agree that those are speculative, correct?

MS. SCOTT: Objection, vague.

THE WITNESS: They're not completely speculative, even though the manuscript by the Complete Genomics people is not peer-reviewed. The advantages of the CoolMPS system with more fluors per antibodies and the demonstration by them -- again, not peer-reviewed -- that they could go from 200 nanometer nanoballs to 50 nanometer nanoballs means that the DNBSeq TX has the capabilities of cracking the 200 terabase sequence alpha-per-run barrier.

Q. BY MR. REINES: Okay. And when you talk about that barrier, it's speculative whether the BGI system allowed it to achieve that, correct? That, you'll agree with?

A. It depends on your definition of speculative. I don't -- I see no technical barriers to that happening.

Q. Whether the BGI systems will even be useful for the USA sequencing market remains to be seen, correct?

that's the most exciting aspect of its platform.

Q. BY MR. REINES: And you understand the output and efficiency of the Illumina system has multiple contributors, correct?

A. Yes, I do.

Q. And one of the key contributors is the sequencing chemistry, correct?

MS. SCOTT: Objection, vague.

THE WITNESS: I believe that is one of many aspects of the system and a small aspect of -- of the thing. The advances on the Illumina platform are many, many advances, and that is just one small part of it.

Q. BY MR. REINES: So you're saying the sequencing chemistry in the Illumina product is one small part of the success of the system? Do I have that right?

MS. SCOTT: Objection.

THE WITNESS: Yes, I am, because the increase in output was -- involved many, many other factors: Better cameras, pattern flow cells, better ways to get better incorporations. So, again, that was a small component of a big multistep process. It contributed to it, but it isn't the major factor.

Q. BY MR. REINES: So you're honestly saying that you don't think sequencing chemistry is a major factor

in the success of the Illumina system? I just want to, I want that to be absolutely crystal clear.

A. I think the decision --

MS. SCOTT: Objection. Wait. Wait. Objection, misstates testimony. Okay.

THE WITNESS: I believe that this is a component among many that contribute to the success of the Illumina platform.

Q. BY MR. REINES: Okay. And what if -- in addition to the homopolymers, what's the other problem that the 454 and Ion Torrent had due to the unblocked nucleotides?

(Clarification requested by court reporter.)

Q. BY MR. REINES: Unblocked nucleotides.

MS. SCOTT: Objection, vague.

THE WITNESS: Well, what's vague about it is the 454 limitation was that it could not get beyond 500 megabases of sequence output.

It was an excellent platform. It was the first -- first generation massively parallel system. It had the longest read length of any of the mass -- the first generation systems, but its limitation was you couldn't get beyond 500 megabases.

The Ion Torrent platform actually started at that point and has gone significantly beyond that. The

Q. Why, in describing the BGI sequencing technology in your declaration, did you put so much emphasis on the three prime blocking group?

(Clarification requested by court reporter.)

MR. REINES: Three prime blocking group.

MS. SCOTT: Objection, vague, and misstates the document.

THE WITNESS: I, when I -- I'm not sure that I put so much emphasis on the three prime blocking group, but as trying to make the distinction between CoolMPS and anything that preceded it.

So it would be the fact that there was actually a separation between the nucleotide end, which is the main cool because it has no label on it, and the fact that the label itself comes on in a subsequent step. So I think that was the emphasis.

The emphasis was not meant to be on the three prime blocking group, but was on the fact that it was cool as compared to what's done on the Illumina platform and the previous BGI platform, and that detection was based on these antibodies and multiple force on the antibodies. That was my -- what I was attempting to emphasize.

Q. BY MR. REINES: If you go to page 36 of your declaration at line 21 and 22, which is paragraph 98, do

Illumina because it used PCR for its --

(Clarification requested by court reporter.)

A. -- you dropped twice in the middle of your question.

Q. Let me start again.

A. I'm sorry. Please ask your question again.

Q. The issue about using PCR in a Illumina system, that issue, you believe, has essentially been resolved with the dual indexing technique, correct?

MS. SCOTT: Objection, calls for speculation.

THE WITNESS: I believe that that is Illumina's claim, yes.

Q. BY MR. REINES: And do you have any reason to disbelieve that?

MS. SCOTT: Objection, calls for speculation.

THE WITNESS: This is outside my area of expertise. I haven't really done multiple indices in a single lane of a sequencer, but my guess would be that they have solved that problem.

Q. BY MR. REINES: Turning to page 41 of your declaration in paragraph 111, line 4, do you see where it says, "Having a choice of vendors gives consumers some degree of leverage to get the best deal possible"?

A. I see that.

Q. And do you agree that -- I think your argument

is that if BGI entered the marketplace, it wouldn't be -- it wouldn't actually be providing a choice of vendor; is that what you're saying?

MS. SCOTT: Objection, misstates testimony.

THE WITNESS: Actually, that's not what I'm saying at all.

I'm saying that right now if you don't have both machines, there's no competition, because if you don't use Illumina, what are you going to put -- are you going to order BGI consumables and put it on what?

When machines are available after the multi-step process in multiple years, then you do have a choice, yes. So it depends on the time frame.

Q. BY MR. REINES: So just so I understand, your opinion is that if BGI is permitted, starts selling sequencers now, the benefits in the competition that you're asserting here about the basic innovation and customer service, that wouldn't kick in for three to four years; is that what you're saying?

A. That is indeed my contention. Right now, it would not offer competition, but when the machines have been tested, when they're found to be robust in the multi-year process, that will offer the consumer choice, yes.

Q. Now, let's turn to the Mayo Clinic's

at lines 11 and 12 you say, "All the technical advantages" -- excuse me, let me start again.

In your declaration, you state, "Of all the technological advantages that I have since 1978" -- I assume you meant "seen"?

A. Yes.

Q. "None have been as important as the events that we have seen in the last 15 years with DNA sequencing capabilities."

Do you see that?

A. Yes, I do.

Q. Do you agree that to be true?

A. Yeah, absolutely.

Q. And the important technological advances in DNA sequencing capabilities over the last 15 years, those have been from Illumina; is that correct?

MS. SCOTT: Objection, misstates the document.

THE WITNESS: Yes, that is correct.

Q. BY MR. REINES: And the patented azido technology at issue in this case is one of those technological advantages, correct?

MS. SCOTT: Objection, misstates the document.

THE WITNESS: The patented azido technology is but one component that led to the success of the Illumina sequencing platform.

Q. BY MR. REINES: Right. You're referring to the technological advantages in DNA sequencing capabilities here that have been important, and I'm saying one of them is the patented azido technology in this case, correct? Not all of them; that's just one of them, right?

MS. SCOTT: Objection, outside the scope.

THE WITNESS: The reason I put 1978 is because that's the year I got my Ph.D. I know you didn't ask this question. And actually, when I rewrite this next year -- there's two components to this. One is the advances -- from 1978 until 1998, all the advances were the Sanger sequencing advances, and those were very significant, too.

But in answer to your question, because of the way I wrote this, the past 15 years, the true -- well, this isn't completely true, either, because the first set of advances were on the 454 sequencing platform.

That in itself, as I described in the document, was a real game changer. That was the birth of the massively parallel sequencing.

But building upon that, the advances that have occurred -- and actually, to answer your question, this includes both 454 and Illumina.

Illumina -- 454 gave the jump start and

Illumina jumped off of that and took us to where we are today, so it's both together. It's not just the blocking groups and Illumina sequencing here.

Q. BY MR. REINES: Okay. So that was a big swig to take on all at once.

A. I can break it down if you want.

Q. Let me ask just ask you this: You'll agree that one of the important technological advances contributed by Illumina to DNA sequencing has been the patented azido technology at issue in this case? There are others, but that's one; isn't that true?

MS. SCOTT: Objection, outside the scope, and calls for speculation.

THE WITNESS: Since you're referring to the sentence that I wrote in my declaration, that sentence is referring to two major advances, the advances on the 454 platform, and then the advances on the Illumina platform.

In answer to your question, the advances on the Illumina platform have been remarkable and have really gone from sequencing the whole gigabase to the sequence of six terabases in a 13-year period.

Q. BY MR. REINES: Among the contributions to the incredible improvement in DNA sequencing technology brought by Illumina, one of them is the patented azido

STATE OF TEXAS)
)ss:
COUNTY OF VAL VERDE)

CERTIFICATE

I, LISA A. BLANKS, a Certified Court Reporter, do hereby certify:

That prior to being examined, the witness was by me duly sworn;

That said deposition was taken down by me in shorthand, and conducted virtually, at the time hereinbefore stated, and was thereafter reduced to writing under my direction;

That I am not a relative or employee or attorney or counsel of any of the parties, or a relative or employee of such attorney or counsel, or financially interested in the action.

WITNESS my hand and seal this 22nd day of April, 2020.

Lisa A. Blanks

LISA A. BLANKS, RPR, CRR, CSR
Certification Number: 4266
Certification Expiration 08/31/2021